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REPORT OF THE CHIEF OF THE BUREAU OF HOME  
ECONOMICS  
U. S. Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF HOME ECONOMICS,  
Washington, D. C., August 1, 1930.

SIR: I present herewith the report of the Bureau of Home Economics for the fiscal year ended June 30, 1930.

Respectfully,

LOUISE STANLEY, *Chief.*

Hon. ARTHUR M. HYDE,  
*Secretary of Agriculture.*

The work of the bureau has proceeded along the general lines outlined in my last annual report.

The demand for cooperation with outside agencies has been exceedingly great. Cooperation with the Washington Child Research Center has continued. I have served as chairman of the advisory committee and have supervised the work of a nutritionist from our staff placed there to study problems of child nutrition. A special study has been made of relation of diet to time and soundness of sleep. We have cooperated in the analysis of data on diet collected from certain isolated Virginia communities.

A request came to this bureau for help in planning diets in several Federal prisons. Conferences were held in regard to the selection of a person to make a preliminary study as a basis for recommendations for needed changes. Since a man was preferred for this job, it did not seem wise to detail any one from this bureau. We have kept in touch with this work, advised from time to time, and furnished recipes on request, working out special recipes to meet the particular needs. The laboratory facilities made available by moving to the Earle Building will increase the possibilities of this cooperation.

I have served as a member of the planning committee of the White House Conference on Child Health and Protection appointed by the President, July, 1929, and have also served as chairman of the committee on the family and parent education. Other members of the staff have served on different advisory committees of this conference. Time has been required for committee meetings and discussion and preparation of reports. Through the conference a research assistant and a clerk have both been made available, who have handled much of the work under direction. The committee, of which I am chairman, has been divided into six subcommittees

with a total membership of 29, who work with specially appointed advisory committees to make up a total of 89 members.

These six subcommittees are collecting data on the family, the activities of the family, and the part they play in the education of children in the home. Through the active cooperation of the members of the committee on the family of the Social Science Research Council, considerable data have been collected on the family, especially in relation to the part it plays in the education of the child. These data have been so organized as to be of value to home economics workers.

A schedule for the study of family situations has been prepared. This will make it possible for workers to collect data which will contribute to the solution of some of the changing social problems and will show the relation of these to the more exact data on standards of living and household production being accumulated as a part of the work of this bureau.

Of special interest will be the reports of the subcommittee considering the adaptation of housing and equipment to the needs of children and the subject of household budgets and labor problems of the household as they must be modified to provide satisfactory conditions and meet the growing needs of children in the home. This subcommittee is subdivided into several smaller committees, each working with a different group of experts, some from Better Homes in America and the American Housing Association, some from land-grant colleges, and others from the staff of this bureau.

Three of the subcommittees are collecting and summarizing material on parent education. In this work the Bureau of Home Economics is cooperating with the National Council of Parent Education, the Office of Education of the United States Department of the Interior, and with various professional and lay organizations handling specialized phases of parent education. As the result of the efforts of these committees and the advisory groups working with them there will be compiled a list of all agencies working in parent education, with a brief analysis of the work of each; a selected list of references to subject matter which might well be used in parent education; and three monographs will also be prepared dealing with the general philosophy underlying parental and preparental education, illustrating types of organization and method by descriptions of specific pieces of work already under way. The foremost workers in each field have contributed to these studies. This material will be of special interest to extension workers, since they are being made increasingly responsible for instruction in child development in the rural home.

While this committee work has been time consuming, we feel that it has been more than worth while in the material it has brought together, the contacts it has made possible, and the cooperative relations which have been established between home economics workers and other groups. It has helped the workers in other fields to appreciate the contribution of home economics, and has given home economics workers a wider vision of their field in relation to the various governmental and lay activities contributing to the welfare of the child.



Members of this bureau have served on several committees of the American Standards Association, working toward the establishment of standards for consumers' goods in cooperation with representatives of manufacturers and distributors. In so far as possible, studies of the bureau have been modified in order to develop factual material for these studies.

It is realized that any program for standard specifications must be based upon detailed knowledge of the equipment in use and of the extent to which it is adapted to the needs of the housewife. Such basic facts given to manufacturers will assist them in their efforts to meet the needs of the consumer and to modify their products accordingly. At the same time the consumer must be educated in the wise selection and use of this equipment. Standard specifications will be of little value unless the housewife understands their basis and knows how to use household equipment in accordance with the specifications.

### FOODS AND NUTRITION

In the foods and nutrition division the work is continuing under the three sections: Proximate composition of foods, nutrition studies, and food utilization and preservation.

#### PROXIMATE COMPOSITION OF FOODS

New summary tables on the proximate composition of 121 classes and varieties of fresh vegetables have been completed, and are in press. With the increase in the variety of fresh vegetables in the American dietary there has been a growing demand from nutrition workers for reliable data on the chemical composition of certain vegetables not included in the older standard food-composition tables. This publication will help to meet this demand and at the same time will provide further information on some of the vegetables included in the older tables.

In the 30 years since the standard tables on proximate composition of foods were issued many vegetables such as broccoli, globe artichokes, Chinese cabbage, and dasheens have gained in popularity. To provide nutrition workers with a satisfactory basis for calculating the composition of these foods in the diet it has been necessary to make a careful search through the literature for suitable analyses. These have been examined critically and supplemented by unpublished records of the United States Department of Agriculture and other cooperating agencies. In a few cases arrangements have been made to have much needed determinations made for the purpose.

In preparing these new summary tables careful attention has been given to the representative character of the chemical samples. The selection and classification of the data have been worked out with the assistance of botanists, plant physiologists, and horticultural specialists who were most familiar with the particular food plant concerned.

The new tables indicate the extent of variations in the composition of individual samples as well as give the average figures. These should provide nutrition workers some measure of the accuracy of the average figures when they use them to calculate the composition of a particular food.

## NUTRITION STUDIES

The assay of watermelon for its vitamin A, B, C, and G content was completed. The results showed watermelon to be a good source of vitamins A and C and to contain small but detectable amounts of vitamins B and G. The editorial comments of newspapers and magazines following a preliminary report in the form of a press release gave evidence of widespread interest in the fact that watermelon might be eaten for the vitamins it supplied. A full report was published later in a scientific journal.

The study on the vitamin A, B, and C content of spinach of three varieties was completed. The data obtained showed the three varieties to be about equally good as sources of vitamins A and B, the latter following the old terminology. The variety with compact, highly wrinkled, dark-green leaves growing close to the ground was less potent in vitamin C. This variety also lost more vitamin C during canning, than did the other two varieties. There was the same loss of both vitamins A and B in the canned product from all three varieties. A report of these studies was given at the spring meeting of the American Chemical Society, and is now being prepared for publication.

The study on the vitamin A content of olives was extended to include green as well as a second variety of ripe olives. One variety of ripe olives proved to be a very good source of vitamin A, whereas the second variety, although having a higher oil content, was a poorer source of this factor.

The methodology studies on vitamin B and vitamin G were continued, and a tentative method for the determination of vitamin G was reported at the spring meeting of the American Chemical Society. The work on these methods is complicated by evidence indicating that the basal diet has other deficiencies, the exact nature of which is as yet unknown.

Incidental to these studies the vitamin B, C, and G content of a commercial banana powder was determined. It was found that this powder was equal, weight for weight, to fresh bananas in anti-neuritic content, that it contained very little vitamin C, and that it had only one-sixth the vitamin G content of the fresh banana.

A study is well under way on the vitamin content of grapes of several varieties and the commercial grape-juice products made from some of these.

The pellagra study in South Carolina was completed, and the data obtained are being analyzed. The analyses of the data so far made indicate that the diets of the families studied are low in calcium, iron, protein, vitamins A, B, and C, as well as deficient in vitamin G. The protein supplied is not only too little, but of poor quality, especially for growing children. It is essential for reasons of health as well as economic prosperity that the diets of these people be made more adequate. This can only be done by making it possible for them to have gardens as well as milk cows. Studies on the vitamin G content of a number of foods used in South Carolina are being planned in order to get information necessary for a complete analysis of the diets used. The results from these studies show that restricted diets can be made to include sufficient vitamin G through intelligent choice of food materials without much increase in cost.



## FOOD UTILIZATION AND PRESERVATION

## MEAT

The work on the palatability of meat handled in cooperation with the Bureau of Animal Industry has continued. During the year 800 roasts of the following kinds from 17 States were cooked: Beef, 116; lamb, 517; mutton, 12; and pork, 155. Cooking losses and data on palatability are being correlated with production factors and the results prepared for publication.

Research on cooking methods has been continued for the purpose of determining the comparative effects of slow and rapid roasting on beef ribs and leg of lamb. So far there appears to be no definite relation between roasting temperature and the tenderness and flavor of beef and lamb roasts. There is, however, a close relation between cooking loss, or shrinkage, and oven temperature. If after beef ribs have been seared in a hot oven, the temperature is rapidly reduced so as to finish the cooking very slowly, the shrinkage of the meat when rare is about one-eighth of the fresh weight; whereas if the roasting goes on to the end in a hot oven the shrinkage is about one-fourth of the fresh weight. Well-done beef shrinks more than rare beef, other things being equal. The beef and lamb used for the cooking experiments have covered a wide range of quality as indicated by market grade. Well-finished, high-grade beef and lamb lose more fat and less water than very thin meat of the same kind and cut. Information on the character as well as the amount of cooking loss to be expected from the different kinds and cuts is necessary for estimating the food value of cooked meats. While the data accumulated so far are too limited for general application, they give a rough indication of what shrinkage can reasonably be expected when a piece of meat of a certain market grade is cooked in a definite way.

## VEGETABLES AND CEREALS

During the past year the first quality tests on vegetable foods were started in cooperation with the Bureau of Plant Industry. Sixty-five seedling potatoes bred by the Bureau of Plant Industry have been studied and selections made of the most promising as determined by cooking tests. A technic was worked out for cooking these potatoes by baking, boiling, steaming, and frying in deep fat, so as to find any differences in quality brought out by the different methods of cooking, and a score card which can be used in recording tests in terms of quality was prepared.

In addition, the influence of 24 different fertilizer ratios and 5 different storage conditions upon cooking qualities of 2 varieties of potatoes was studied. The most interesting result was that storage conditions affect the cooking quality very materially, due to the accumulation of sugar in potatoes held at low temperatures. This sugar browns rapidly when the potatoes are fried, and it was therefore impossible to make good potato chips from potatoes stored at temperatures of 50° F. and below. This point is of practical significance to restaurant keepers, manufacturers of potato chips, and those engaged in handling potatoes for either of these groups.

The work on rice has been continued. Special emphasis was placed last fall on a comparative study of the native-grown and imported Patna in canned soup. Since the varieties sent in had not been seasoned as well as the imported varieties, it seemed wise to repeat these tests after a year of aging. A number of recipes have been prepared and some additional tests have been made of the amount of water absorbed during cooking by rices of different varieties. The variety and the age of the rice make a difference, but we have been unable to get a sufficient number of samples of known history to test this matter satisfactorily. One point of practical significance brought out was that certain varieties should not be shipped to countries of high altitude because they do not cook there so readily. Other varieties are available that will cook much more readily under these conditions.

In connection with our recommendation for the use of rice polishings and wheat germ in certain home products, methods for processing and keeping these in the home have been tested. These products not only tend to grow rancid if kept in the home, but become infested with insects.

The food-utilization section has prepared recipes for radio talks, special attention having been paid to development of recipes for cooking vegetables and directions for jelly making. This unit has done considerable cooking for the various exhibits where wax models must be made and also for photographing. Recipes for the use of domestic rabbit were prepared for a leaflet. The experiments to test the keeping quality of certain varieties of pickles have been checked. A special study has been made as to the length of time fruit and sugar mixtures may be kept in household refrigerators.

#### HOME CANNING

So many requests for information about oven canning came in that tests were made to find the temperature curve in this process. It was found that the temperature on the inside of the jar never reached higher than boiling and that heating-up tended to be somewhat slower in the oven than when the jars were immersed in boiling water. The directions sent out by the different authorities recommending the oven method vary, and even such practices as the use of a pan in which to stand the jars may cause differences in the time required for the interior of the jars to reach boiling temperature. All these factors are important in efficient sterilization, but most important is the fact that the contents of the jars, even though the jars are placed in an oven at a temperature above boiling, never attain a temperature higher than boiling. Oven canning can not, therefore, be recommended as a method for sterilizing nonacid vegetables. A check has been made also of all the home-canned material which has been canned and stored in the bureau laboratories for varying periods of time.

#### HOUSEHOLD REFRIGERATION

In connection with the work of the foods and nutrition division certain studies have been undertaken in household refrigeration, in order to discover the best method for handling the temporary storage of food in the home. During the past two years extensive studies



have been made of various grades of household refrigerators, with particular emphasis upon the reliability of test methods. Data from this work were used as a basis of a test code for ice-cooled household refrigerators by one of the subcommittees of specifications for refrigerators of the American Standards Association. Two papers based on these data have been published in refrigeration journals.

This work has been followed up with a more specific inquiry of the characteristics and properties of the organisms responsible for spoilage under improper refrigeration conditions in the home. The practical objective of this study is to find an answer to the questions, "When is meat spoiled?" and "Are the bacteria or the products of bacterial metabolism responsible for spoilage and consequent food poisoning?" In this respect the demonstrated ability of the predominating type of organism to break down the proteins into amino acids and to attack further and break down the amino acids has an important significance.

## ECONOMIC STUDIES

### STANDARDS AND COST OF LIVING

The studies of standards and cost of living previously undertaken include three groups of families—farm families, families of business and professional men living in cities, and families receiving mothers' pensions. These studies are now completed and reports have been prepared covering the food and clothing expenditures of the farm group and all items in the family budget for the two latter groups. A report of the study comparing the survey and account-book methods of obtaining data on family expenditures has also been prepared.

A new study was started during the year with a fourth group of families—those living in the southern Appalachian highlands in Kentucky. Any attempt to improve the standards of living in this region must take into consideration not only the diet, health, and living conditions of the families, but also the size and sources of the family income, the use which is made of the land, and the character of the schools, public-health agencies, and other facilities provided by the community. The study is therefore being made in cooperation with the economists and sociologists of the Bureau of Agricultural Economics and of the Kentucky Agricultural Experiment Station, and has for its general object the development of a sound economic, social, and educational program of readjustment for these families. The bureau's share in the study covers the various aspects of family living, and a special schedule has been prepared for securing information which will reveal the most promising points for improving diet and living conditions and increasing the efficiency with which the money and labor resources of the family are used.

In response to the demand for information concerning studies of standards and cost of living an annotated bibliography of over 200 titles has been prepared covering all the important studies that have been made in the United States. This bibliography was presented at the Pan-Pacific Women's Conference held in Hawaii during the summer of 1930 and will be utilized by investigators in the Pan-Pacific countries who are planning to initiate standard-of-living studies and wish to become familiar with the scope and methods used in similar investigations in the United States.

## DIETARY STUDIES

Up to the present time studies of food-consumption habits have been made with eight different population groups. Three of these investigations have formed part of the larger studies of family standards of living referred to above, and reports of these have been prepared. The other five studies have dealt with food consumption only. During the year reports appeared on two of these studies, one a circular on the nutritive value and cost of food served to college students and the other a pamphlet on a study of the food at St. Paul's School.

The last study undertaken of the dietary habits of farm families in South Carolina affected with pellagra has been continued during the year in cooperation with the foods and nutrition division.

## HOUSEHOLD PRODUCTION

The study of the use of time by home makers has been extended during the year to include city households in order that comparison may be made between rural and urban conditions. Records have been obtained from over 500 college graduates who are married and living in cities of 50,000 population and over. These home makers, representing as they do a fairly uniform and relatively favored group as to economic and social status, afford a significant contrast with the larger group of rural home makers previously studied. The report of the rural group is being prepared and the analysis is now being started of the city records.

The results of these studies indicate the extent to which home makers are overworked and underworked in various types of homes and at various periods in the family's life, and the extent to which labor-saving equipment and the use of commercial products and services reduce the time required for housekeeping. Since the records kept by the home makers cover all of their activities during the 24 hours of each day the results also throw light on the amount of leisure which they enjoy and the ways in which they use this leisure. This information will be of value to extension workers and other groups interested in aiding the home maker to reduce the work of housekeeping and to coordinate other work and interests with her home-making responsibilities.

## TEXTILES AND CLOTHING

The introduction of new fibers and finishes into the textile market has brought increasing problems to the home maker who, with a limited knowledge of textile values and no facilities for quickly testing materials, is trying to make wise selections from the materials shown on the retail counter. Realizing the seriousness of the situation from an economic standpoint, the Division of Textiles and Clothing has attempted to assist by pointing out the need of certain fundamental researches which would give facts helpful to the consumer and by initiating as many of such projects as possible. Cooperation has been effected with the American Home Economics Association in the efforts of that organization to set up quality specifications which can be used by the home maker in purchasing certain textile commodities. An outline of club programs considering the



various aspects of household purchasing has been prepared in cooperation with the association, and has been very widely used this year by women's groups throughout the country.

#### WOOL UTILIZATION

For the first time since the organization of the division, it has been possible to start projects dealing directly with wool utilization. A small appropriation made for this purpose has provided for the installation of a constant humidity room and much of the equipment necessary for future work along this line.

A series of investigations is under way in cooperation with the Bureau of Animal Industry in which the effect of various grades of new and reworked wool on the physical properties of blankets is studied. Wool produced under the direction of the Bureau of Animal Industry is being used, and the manufacturing processes are carried on under controlled conditions. Arrangements have been made to test the wearing qualities of the blankets in a Boston hospital and a United States veterans' hospital in Washington. Laboratory determinations of the physical properties of the finished fabrics will be made, and in this connection methods of making special tests have been investigated. An optical method of determining the thickness of napped fabrics has been developed, and special apparatus of various kinds built.

#### COTTON UTILIZATION

Studies on the relation of grade and character of cotton to the properties and wearing qualities of finished fabrics have been continued. Cotton graded by specialists in the Bureau of Agricultural Economics was made into sheets under controlled, experimental conditions. These were completely analyzed in the laboratories of the bureau and 109 sheets are being used under actual wearing conditions in a Washington hotel. A worker checks the condition of these sheets each day and at definite intervals removes samples for laboratory testing.

Special attention is being given to the utilization of cotton for household purposes. Cooperation has been continued with the new uses committee, upon which the Department of Commerce and the Cotton Textile Institute, as well as the Department of Agriculture, have representation. The farmers' bulletin on window curtaining has been revised and is now in press, and a series of leaflets on household furnishings utilizing textile materials is in course of preparation.

Investigations on the deterioration of cotton materials during laundering have been continued. Special attention has been given to a study of the formation of oxidized cellulose as a result of temperatures used in ironing. The quantitative determination of relative amounts of this material was one of the first problems. The following methods were used for this purpose: Viscosity of cuprammonium solutions of cotton, alkali solubility, silver number, and macro and micro copper numbers.

The viscosity measurements were made with a burette consistometer. By means of this instrument a series of accurate observations were rapidly obtained at different rates of flow by permit-



ting the hydrostatic head to vary. The results are plotted in flow-pressure diagrams. Viscosity measurements of cotton solutions have previously been made at a single average hydrostatic head.

The method commonly used for determining the alkali solubility of tendered cotton was found to give high and variable results. Accurate values were obtained by preventing the adsorption of water vapor during weighing and by determining the percentage of moisture originally present in the fabric on a separate sample. Glass-sintered filter crucibles proved much more satisfactory than the Gooch crucibles generally used.

Copper numbers were found to be influenced slightly by the degree of subdivision of the sample of fabric taken for analysis. In order to obtain a relatively uniform degree of subdivision and to prepare samples easily and rapidly, a special nonheating electric mill with a cutting rather than a tearing or grinding action was chosen for disintegrating the fabric. The values varied considerably with the concentration of the alkali solution used and also with the temperature of digestion. A distinct end point was obtained in the titration by substituting sodium molybdate for ferric alum.

Results obtained for copper numbers by the micro method agreed with those found by the macro method. The structure of cloth often appears somewhat uneven over the surface. Under such conditions the micro copper number will be particularly useful in testing small scorched areas.

Preliminary experiments indicate that the amount of oxidized cellulose formed as estimated by these methods is proportional to the color of scorch obtained under similar experimental conditions. The amount of size present in the fabric appears to influence the results.

Colorimetric methods of estimating the amount of scorch were studied. It was found that slight degrees of scorch were not always detectable by total color measurements. However, with the use of a modified spectro-photometric method it was possible to detect the very lightest scorch in cloth by the changed reflection for light in the violet part of the spectrum as given by the mercury lamp. Very slight surface scorch was thus found on the thicker sheetings for which tensile-strength tests appeared to be unchanged.

Various changes have been made in the experimental ironer. In order to obtain the needed higher temperatures, it was necessary to construct a new heating element of higher wattage and different heat distribution along the length of the shoe. Owing to the warping effect obtained in the metal of the shoe on being heated to higher temperatures, a more detailed study of the contact between the heated shoe and the roll of the ironer is being made. Different improvements in the padding of the roll are also being tried out.

Methods for obtaining a uniform moisture distribution in cloth to be ironed have been considered and a quick laboratory method for determining the amount of the moisture in the cloth has been selected.

The finishing of cotton fabrics in the laundering process has opened up important fundamental problems in regard to the relation of viscosity of starch mixtures to the penetration of such mixtures into yarns and fabrics and to the stiffness of the laundered fabrics. Rice, corn, potato, wheat, dasheen, and canna starches are

being used in this work with the object of determining the particular type of starch mixture most useful for cotton-fabric sizing. Viscosity determinations have been made of the pastes at the temperature used in starching and their penetration into yarns and fabrics studied by microphotographic technic developed for this research. The size of the original and of the swollen starch grains has been measured in an effort to explain some of the differences in penetration which have been noted. It appears that dasheen, rice, and corn starch grains which have the smallest raw and swollen sizes penetrate most thoroughly. Wheat, which is not uniform in size, seems both to penetrate and to coat the yarns and fabrics. The large grain starches—potato and canna—form heavy coatings of paste and penetrate only slightly.

#### CHILDREN'S CLOTHING

The work on children's clothing has continued to meet a widespread demand. To date 325,000 copies of the leaflets prepared in the division describing self-help clothing have been distributed, most of them in answer to individual requests. Two exhibits of the garments have been in constant demand and have been sent to 25 child clinics, nursery schools, and extension conferences. At some of these they are retained as long as six weeks, in order to accommodate many different conferences and group meetings. These included college and nursery school classes, conferences of extension leaders, and meetings of rural and urban home makers. The reports indicate that at least 10,000 women were reached in this way. A number of the State extension offices have made duplicate sets of the garments sent from Washington and are using them in their extension classes.

Leaflet 54, Play Suits for Winter, Leaflet 52, Suits for the Small Boy, and Leaflet 63, Ensembles for Sunny Days, came from the press during the year. The leaflets on children's rompers and dresses for the little girl are being revised. The designs developed by the division are attracting the attention of pattern and garment manufacturers and are being introduced more and more into the trade. To date commercial patterns are being made for 11 of the self-help garments designed in this division.

A study of the physical properties of 25 cotton and wool fabrics available for children's play suits was completed and submitted for publication. Fourteen different physical and mechanical tests were made on each of these in an effort to form an estimate of their comparative value for this purpose. A lightweight duck and a new unclassified cotton cloth (both made from 2-ply yarns) were found to be the strongest and the most durable of the cotton materials. One of the woolen coverts proved to be particularly resistant to wear and to tearing. The close, proofed fabrics, such as sail cloth, duck, and the unclassified cotton fabrics, were especially impervious to the passage of air. Since in the measurements for heat-retaining power, an unusually high value was given by a lightweight, porous, fluffy woolen material under one of the close cotton fabrics, such a combination was recommended for use in extremely cold weather. The results of the study were printed in a trade journal for the information of manufacturers. In connection with this project, an apparatus for determining the waterproof properties of fabrics was developed and a paper describing it published in a scientific journal.



## HYGIENE OF CLOTHING

A summary of all books and periodical references dealing with the relation of clothing to health was printed during the year in order to show the importance of this subject and the great dearth of information in regard to it. A complete search of all English, French, and German publications on this and related subjects revealed only approximately a thousand references and most of these represented opinions and not facts.

## GARMENT SIZES

The matter of correct garment sizes was again brought to the attention of the division this year. Requests have come for assistance from garment, glove, and shoe manufacturers who recognize that the present chaotic situation can not be remedied without a comprehensive determination of the body measurements necessary for clothing. Preliminary to research on this subject a summary of the literature was made and published as *An Annotated List of Literature References on Garment Sizes and Body Measurements*.

## TEXTILE BIBLIOGRAPHICAL SERVICE

In response to a resolution passed by the Textile Research Conference called by the American Home Economics Association at Manhattan, Kans., last winter, the division has increased its literature reference service. The literature dealing with textile research is at present meager and widely scattered. By providing reference lists, abstracts, and bibliographies, assistance is given the many investigators who do not have access to well-equipped libraries. An annotated list of periodicals recommended for those schools contemplating research in any phase of textiles has been prepared.

## LIBRARY

With the growth of the bureau the library has increased its book collection to about 2,700 volumes in addition to State and Government publications. The bureau librarian has assisted in the revision of special bibliographies, and has added materially to the efficiency of the work of the bureau by the help that she gives in assembling material needed by members of the research staff. Gradually this bibliographical assistance is being extended to research workers in the States when their library facilities are not available.

## INFORMATION SERVICE

That the research program of the bureau is meeting a definite need on the part of the general public as well as of specialized groups of producers and professional workers is clearly evidenced by the yearly increasing demands on the information section. During the past year 20,000 letters requesting information on some phase of home economics were answered, an increase of 5,000 over the preceding year and just double the volume handled two years ago. The distribution of our printed publications also reached a new total of 2,925,882 copies sent free in response to definite requests and not including sales by the Superintendent of Documents.



The following 14 publications have been issued through department channels during the past fiscal year, or are in press:

- Vitamins in Food Materials. Circular 84.
- Nutritive Value and Cost of Food Served to College Students. Circular 89.
- Bibliography on the Relation of Clothing to Health. Miscellaneous Publication 62.
- An Annotated List of Literature References on Garment Sizes and Body Measurements. Miscellaneous Publication 78.
- Window Curtaining. Farmers' Bulletin 1633. (In press.)
- Pork in Preferred Ways. Leaflet 45.
- Reindeer Recipes. Leaflet 48.
- Ice Creams Frozen without Stirring. Leaflet 49.
- Suits for the Small Boy. Leaflet 52.
- Play Suits for Winter. Leaflet 54.
- Ensembles for Sunny Days. Leaflet 63.
- Rabbit Recipes. Leaflet 66. (In press.)
- Nutrition Charts. Series of nine; 16 by 20 inches in size.
- Household Refrigeration Charts. Series of six; 16 by 20 inches in size.

Eight articles were also contributed to the Yearbook of Agriculture, 1930, describing as many different phases of the work in economic problems, food and textile utilization, vitamin research, and household refrigeration. Press material and special articles for scientific, trade, and educational journals reached a total of 309 items. The majority of these popular and technical articles were illustrated with photographs taken especially for the purpose. The posing of photographs in line with modern graphic developments to illustrate particularly the press material on food preparation has become one of the important functions of the information service. Writers for magazines and of feature articles for newspapers are requesting more and more material of this kind to accompany subject matter that they get from the bureau. Material supplied in this way greatly augments that written within the bureau, and every effort has been made to meet these requests from outside writers.

The cooperative arrangement with the radio service whereby material is furnished regularly for the housekeepers' chats was continued. This year 150 menus were supplied, oftentimes with accompanying new recipes and subject matter suggestions for inclusion in the radio releases. In addition 45 radio talks known as the Household Calendar, forming part of the Farm and Home Hour, have been broadcast direct from Washington over a chain covering the United States as far west as the Rocky Mountains. The letters from approximately 10,000 women a month received by the radio service are conclusive proof that this service is what women want and is one of the most successful ways yet tried for disseminating information from the department.

An exhibit of wax models featuring beef, the center of a balanced meal, was prepared for the 1929 International Livestock Show in Chicago, and similar models of poultry were sent to the International Poultry Congress in London.

In every line of its work, the information service reflected the steadily growing demand of home makers, teachers, and all groups concerned with the production and consumption of the goods and services used in the home, for scientific facts gathered from the home-economics standpoint.

